

Listing of Claims after the PRELIMINARY AMENDMENT filed February 10, 2004, and as they currently stand:

**CLAIM LISTING**

1. (Original) An isolated nucleic acid molecule selected from the group consisting of:

(a) nucleic acid molecules which hybridize under stringent conditions to a molecule consisting of a nucleotide sequence set forth as SEQ ID NO:1 and which code for a polypeptide having C $\alpha$ -formylglycine generating activity (FGE),

(b) nucleic acid molecules that differ from the nucleic acid molecules of (a) in codon sequence due to the degeneracy of the genetic code, and

(c) complements of (a) or (b).

2 to 6 (Canceled)

7. (Currently Amended) An expression vector comprising the isolated nucleic acid molecule of claim 1, ~~2, 3, 4, 5, or 6~~, operably linked to a promoter.

8. (Canceled)

9. (Original) A host cell transformed or transfected with the expression vector of claim 7.

10. (Canceled)

11. (Currently Amended) An isolated polypeptide encoded by a nucleic acid molecule of claim 1, ~~2, 3, or 4~~, wherein the polypeptide, or fragment of the polypeptide, has C $\alpha$ -formylglycine generating activity.

12 to 15 (Canceled)

16. (Currently Amended) An isolated binding polypeptide which binds selectively a polypeptide encoded by an isolated nucleic acid molecule of claim 1, ~~2, 3, or 4~~.

17 to 18 (Canceled)

19. (Original) A family of isolated polypeptides having C $\alpha$ -formylglycine generating activity, each of said polypeptides comprising from amino terminus to carboxyl terminus:

- (a) an amino-terminal subdomain 1;
- (b) a subdomain 2 containing from 120 to 140 amino acids comprising at least 8 Tryptophans;
- (c) a carboxy-terminal subdomain 3 containing from 35 to 45 amino acids;

wherein subdomain 2 has at least about 50% homology to subdomain 2 of a polypeptide selected from the group consisting of SEQ ID NO. 2, 5, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, and 78; and

wherein subdomain 3 has at least about 75% homology and a length approximately equal to subdomain 3 of a polypeptide selected from the group consisting of SEQ ID NO. 2, 5, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, and 78.

20. (Canceled)

21. (Original) A method for determining the level of FGE expression in a subject, comprising measuring expression of FGE in a test sample from the subject to determine the level of FGE expression in the subject.

22 to 31 (Canceled)

32. (Original) A method for identifying an agent useful in modulating C $\alpha$ -formylglycine generating activity, comprising:

(a) contacting a molecule having C $\alpha$ -formylglycine generating activity with a candidate agent,

(b) measuring C $\alpha$ -formylglycine generating activity of the molecule, and

(c) comparing the measured C $\alpha$ -formylglycine generating activity of the molecule to a control to determine whether the candidate agent modulates C $\alpha$ -formylglycine generating activity of the molecule,

wherein the molecule is a nucleic acid molecule having a nucleotide sequence as the one set forth as SEQ ID NO:1, or an expression product thereof.

33. (Original) A method of diagnosing Multiple Sulfatase Deficiency in a subject, said method comprising:

(a) contacting a biological sample from a subject suspected of having Multiple Sulfatase Deficiency with an agent, said agent specifically binding to a molecule selected from the group consisting of: (i) a

nucleic acid molecule having a nucleotide sequence as the one set forth as SEQ ID NO:1, (ii) an expression product of the nucleic acid molecule of (i), or (iii) a fragment of the expression product of (ii); and

b) measuring the amount of bound agent and determining therefrom if the expression of said nucleic acid molecule or of an expression product thereof is aberrant, aberrant expression being diagnostic of the Multiple Sulfatase Deficiency in the subject.

34 to 39 (Canceled)

40. (Original) A kit, comprising a package containing:

an agent that selectively binds to the isolated nucleic acid of claim 1 or an expression product thereof, and

a control for comparing to a measured value of binding of said agent to said isolated nucleic acid of claim 1 or expression product thereof.

41 to 43 (Canceled)

44. (Original) A method for treating Multiple Sulfatase Deficiency in a subject, comprising:

administering to a subject in need of such treatment an agent that modulates C $\alpha$ -formylglycine generating activity, in an amount effective to treat Multiple Sulfatase Deficiency in the subject.

45 to 50 (Canceled)

51. (Original) A method for increasing C $\alpha$ -formylglycine generating activity in a subject, comprising:

administering an isolated FGE nucleic acid molecule of the invention or an expression product thereof to a subject, in an amount effective to increase C $\alpha$ -formylglycine generating activity in the subject.

52 to 54 (Canceled)

55. (Original) A method for increasing C $\alpha$ -formylglycine generating activity in a cell, comprising:

contacting the cell with an isolated nucleic acid molecule of claim 1 or an expression product thereof, in an amount effective to increase C $\alpha$ -formylglycine generating activity in the cell.

56. (Currently Amended) A pharmaceutical composition, comprising:

an agent comprising an isolated nucleic acid molecule as claimed in any one of Claims 1-8, an FGE nucleic acid molecule having a sequence selected from the group consisting of SEQ ID NO: 1, 3, 4, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, and 80-87, or an expression product thereof, in a pharmaceutically effective amount to treat Multiple Sulfatase Deficiency, and  
a pharmaceutically acceptable carrier.

57. (Canceled)

58. (Original) A solid-phase nucleic acid molecule array consisting essentially of a set of nucleic acid molecules, expression products thereof, or fragments thereof, each nucleic acid molecule encoding for a polypeptide selected from the group consisting of SEQ ID NO. 2, 5, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, and 78, Iduronate 2-Sulfatase, Sulfamidase, N-Acetylgalactosamine 6-Sulfatase, N-Acetylglucosamine 6-Sulfatase, Arylsulfatase A, Arylsulfatase B, Arylsulfatase C, Arylsulfatase D, Arylsulfatase E, Arylsulfatase F, Arylsulfatase G, HSulf-1, HSulf-2, HSulf-3, HSulf-4, HSulf-5, and HSulf-6, fixed to a solid substrate.

59 to 61 (Canceled)

62. (Currently Amended) A method for increasing sulfatase activity in a cell, comprising:

contacting a cell expressing a sulfatase with an isolated nucleic acid molecule as claimed in Claims 1-8, or a nucleic acid molecule having a sequence selected from the group consisting of SEQ ID NO: 1, 3, 4, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, and 80-87, or an expression product thereof, in an amount effective to increase sulfatase activity in the cell.

63 to 67 (Canceled)

68. (Currently Amended) A pharmaceutical composition, comprising:

a sulfatase that is produced by cell, in a pharmaceutically effective amount to treat a sulfatase deficiency, and  
a pharmaceutically acceptable carrier,

wherein said cell has been contacted with an agent comprising an isolated nucleic acid molecule as claimed in Claims 1-8, or a nucleic acid molecule having a sequence selected from the group consisting of

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SEQ ID NO: 1, 3, 4, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, and 80-87, or an expression product thereof.

69. (Original) An isolated variant allele of a human FGE gene, which encodes a variant FGE polypeptide, comprising:

an amino acid sequence comprising at least one variation in SEQ ID NO:2, wherein the at least one variation comprises: Met1Arg; Met1Val; Ser155Pro; Cys218Tyr; Ala279Val; Arg327Stop; Cys336Arg; Arg345Cys; Arg349Trp; Arg349Trp; Arg349Gln; Ser359Stop; or a combination thereof.

70 to 76 (Canceled)

77. (Original) A sulfatase-producing cell wherein the ratio of active sulfatase to total sulfatase produced by the cell is increased, the cell comprising:

- (i) a sulfatase with an increased expression, and
- (ii) a Formylglycine Generating Enzyme with an increased expression,

wherein the ratio of active sulfatase to total sulfatase produced by the cell is increased by at least 5% over the ratio of active sulfatase to total sulfatase produced by the cell in the absence of the Formylglycine Generating Enzyme.

78 to 85 (Canceled)